

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-30. Cancelled.

31. A spectrometer module comprising:

an input, for receiving an incoming optical signal,

a differential group delay (DGD) element adapted to apply a set of mutually different birefringence retardations to the incoming optical signal,

a polarizer for selecting a component of polarization from a signal output from the DGD element, and

a power detector unit for detecting the power in the selected component of polarization of a signal exiting the DGD element, for each retardation applied by the variable DGD element.

32. A spectrometer module as in claim 31 wherein the DGD element includes a plurality of laterally spaced sub elements having different optical lengths.

33. A spectrometer module as claim 32, wherein the incoming optical signal is arranged to have substantially the same width as the DGD element, thereby covering each of the laterally spaced sub elements.

34. The spectrometer module as in claim 32, wherein the DGD element comprises a plane incidence surface that is orthogonal to the optical signal path, and a stepped exit surface.

35. The spectrometer module as in claim 31, wherein the DGD element is part of a birefringent system and is sandwiched between a first and a second reflective element, wherein the incoming optical signal is arranged to be reflected between the reflective elements one or more times before being outputted from the birefringent system.

36. The spectrometer module as in claim 35, wherein the first and second reflective elements include a first and second mirror element, respectively.

37. The spectrometer module as in claim 35, wherein the first and second reflective elements include a first and a second retroreflector, respectively.

38. The spectrometer module as in claim 31, wherein the incoming optical signal have a polarization so as to inject light in both birefringence eigenaxes of the DGD element.

39. The spectrometer module as in claim 31, wherein the DGD element is manufactured from an electro-optical birefringent material.
40. The spectrometer module as in claim 39, wherein the DGD element is arranged between a first and a second electrode structure, the electrodes being arranged to generate an electric field over the DGD element.
41. The spectrometer module as in claim 31, wherein the variable DGD element is adapted to be connected with an acusto-optic transducer.
42. The spectrometer module as in claim 31, wherein the power detector unit is adapted to be connected with an electronic processing device, in which a detected signal may be processed to extract information regarding properties including at least one of power, state of polarization and degree of polarization of the incoming optical signal as a function of wavelength.
43. A spectrometer module comprising:
- an input, for receiving an incoming optical signal,
 - a differential group delay (DGD) element adapted to spatially apply a set of mutually different birefringence retardations to the incoming optical signal,

an array of detectors for detecting the power in a plurality of spatially separated signals determined by the retardation applied by the DGD element and, a lens placed between the DGD element and the detector array, wherein the detector array is arranged in the Fourier focal plane of the lens.

44. A spectrometer module as in claim 43, wherein the DGD element includes a birefringent element having a decreasing thickness in a direction being transverse to the incoming optical signal.

45. The spectrometer module as in claim 43, wherein the incoming optical signal is arranged to be slightly divergent.

46. The spectrometer module as in claim 43, wherein the incoming optical signal have a polarization so as to inject light in both birefringence eigenaxes of the DGD element.

47. The spectrometer module as in claim 43, wherein the power detector unit is connectable with an electronic processing device, in which a detected signal may be processed to extract information regarding properties including at least one of power, state of polarization and degree of polarization of the incoming optical signal as a function of wavelength.

48. A spectrometer device for measuring the optical spectrum of an optical signal, comprising:

a first and a second spectrometer module as described in claim 31, and
a polarization splitter, wherein the polarization splitter is arranged to split the optical signal into a first and a second signal segments, and wherein the first signal segment is arranged to be inputted to the first spectrometer module, and the second signal segment is arranged to be inputted to the second spectrometer module.

49. A monitor module for measuring properties including at least one of power, state of polarization and degree of polarization of an incoming optical signal as a function of wavelength, the monitor module comprising:

a polarization control module connected with a control unit,
a spectrometer module as in claim 31, the spectrometer module being connected with the control unit, and
a polarizer placed between the polarization control module and spectrometer module.

50. The monitor module as in claim 49, wherein the polarization control module comprises:

a first birefringent element,
a second birefringent element,

each of the birefringent elements being connected with a power source for individual control of the birefringence of the first and second birefringent element, respectively.

51. The monitor module as in claim 50, wherein the birefringence eigenaxes of the second birefringent element is not aligned in relation to the birefringence eigenaxes of the first birefringent element.

52. The monitor module as in claim 50, wherein the birefringent eigenaxes of the first and second birefringent elements are coinciding, and a quarter wave element that is non-aligned with the birefringent eigenaxes of the birefringent elements is arranged between the first and second birefringent elements.

53. A unit for monitoring an optical signal, being transmitted in an optical network, the unit comprising:

a coupler arranged to be inserted along a optical transmission path of the optical network, the coupler having a main input and output, respectively, for receiving and transmitting the optical signal and at least one drop output, to which a portion of the optical signal is droppable, the drop output being connected with one of a spectrometer module as described in claim 31 and a monitor module as described in claim 49.

54. A monitoring system for an optical network, comprising a plurality of network elements, such as transmitters, receivers, transmission lines, amplifiers or the like, the monitoring system comprising:

two or more monitoring stations, each of the monitoring stations being positioned between two network elements of the optical network and each of the stations comprising one of a spectrometer module as in claim 31, a monitor module as in claim 49 and a monitoring unit as in claim 53 and

a monitoring hub connected with each monitoring station, the hub being arranged to receive measured signal data from each of the monitoring stations, and the monitoring hub including a processing unit for processing the measured signal data.

55. A method of monitoring and measuring properties such as power, state of polarization and degree of polarization of an incoming optical signal as a function of wavelength, the method comprising the steps of:

inputting the incoming optical signal to a DGD element,
applying a variable birefringence retardation to the incoming optical signal by letting it pass the DGD element,
polarizing the signal exiting the DGD element, and
detecting the power of the signal exiting the DGD element, having a determined state of polarization.

56. The method according to claim 55, further comprising the step of:
dropping the incoming optical signal from a wavelength division multiplexed (WDM) fiber
optical communication system that is to be monitored.

57. A method of monitoring and measuring properties such as power, state of
polarization and degree of polarization of an incoming optical signal as a function of
wavelength, the method comprising the steps of:

inputting the incoming optical signal to a DGD element,
applying a spatially birefringence retardation to the incoming optical signal by
letting it pass the DGD element,
projecting the signal exiting the DGD in a focal plane of a lens, and
detecting the power of the signal exiting the DGD element at a plurality of locations
in the focal plane.

58. The method according to claim 57, further comprising the step of:
dropping the incoming optical signal from a wavelength division multiplexed (WDM) fiber
optical communication system that is to be monitored.